

BARNACLES ON TURTLES IN QUEENSLAND WATERS
WITH DESCRIPTIONS OF THREE NEW SPECIES

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ABSTRACT

Seventeen species of barnacle are described from five species of turtle. *Tubicinella cheloniae*, *Stomatolepas dermochelys*, and *Platylepas coriacea* are described as new; *Stephanolepas muricata* is recorded from Australian waters for the first time, and *Lepas hillii*, *L. anserifera*, *L. anserifera*, *Conchoderma virgatum*, *C. auritum*, *Balanus trigonus*, *B. variegatus*, *Chelonibia testudinaria*, *C. caretta*, *Stomatolepas praegustator*, *S. transversa*, *Platylepas hexastylus* and *P. decorata* are also recorded. Hosts recorded are *Chelonia mydas*, *C. depressa*, *Caretta caretta*, *Dermochelys coriacea*, and *Eretmochelys imbricata*. A key to the barnacles is given.

The material for this study was collected during the long term turtle research programme being conducted in Queensland waters by one of us (C.J.L.), and the taxonomic analysis was conducted by the other (R.M.).

There have been many reports of barnacles on turtles, but usually within the context of a more generalized taxonomic study (Darwin 1954; Pilsbry 1916; Stubbings 1965, 1967). This study is restricted to barnacles occurring on turtles, and especially barnacles of the family Coronulidae.

Barnacles of the family Coronulidae are obligate epizooans of a wide range of hosts and are commonly called 'turtle' or 'whale' barnacles, though also occurring on sirenians, sea snakes, crustaceans, molluscs, and fish (Ross and Newman 1967). The other two families represented in the collections for this paper (Lepadidae and Balanidae) may be regarded as facultative epizooans.

Seventeen species from five families are recorded from five hosts. Three species are described as new; *Tubicinella cheloniae*, *Stomatolepas dermochelys*, and *Platylepas coriacea*. Family names follow Newman and Ross (1976).

Register numbers prefixed by 'W' indicate material held in the Queensland Museum. 'U.S.N.M.' prefixes material from the Smithsonian Institution, Washington; 'N.Z.O.I.' the New Zealand Oceanographic Institution in Wellington; 'R.M.N.H.' the Rijksmuseum von Natuurlijke Historie, Leiden; 'B.M.N.H.' the British Museum

(Natural History), London; 'Z.S.I.' the Zoological Survey of India, Calcutta; and 'I.R.S.N.B.' the Institut Royal des Sciences Naturelles de Belgique, Brussels.

SYSTEMATICS

Family LEPADIDAE

Lepas anserifera Linnaeus 1767
(Fig. 1)

MATERIAL EXAMINED

W6456-8, 3 specimens, Mon Repos, SE.Q., all ex *Caretta caretta*.

Valves white, furrowed in radiating lines; right scutum with a large umbonal tooth, left with a small tooth; carina contiguous with scuta and terga; peduncle short, dark purple brown, with a pale band at the junction with the capitulum; cosmopolitan, tropical and sub-tropical waters.

Lepas anatifera Linnaeus 1758
(Fig. 2)

MATERIAL EXAMINED

W6453-5, W7375, 21 specimens, Mon Repos, SE.Q., all ex *Caretta caretta*.

Distinguished by its white valves, sometimes bluish tinted, sometimes with a diagonal band(s) of small dirty green squares from umbo to carina;

carina contiguous with scuta and terga; right scutum with a large umbonal tooth, left scutum without a tooth; peduncle dark purple to brown, without a pale band at the junction with the capitulum, may be elongate in older specimens; cosmopolitan, tropical and temperate waters.

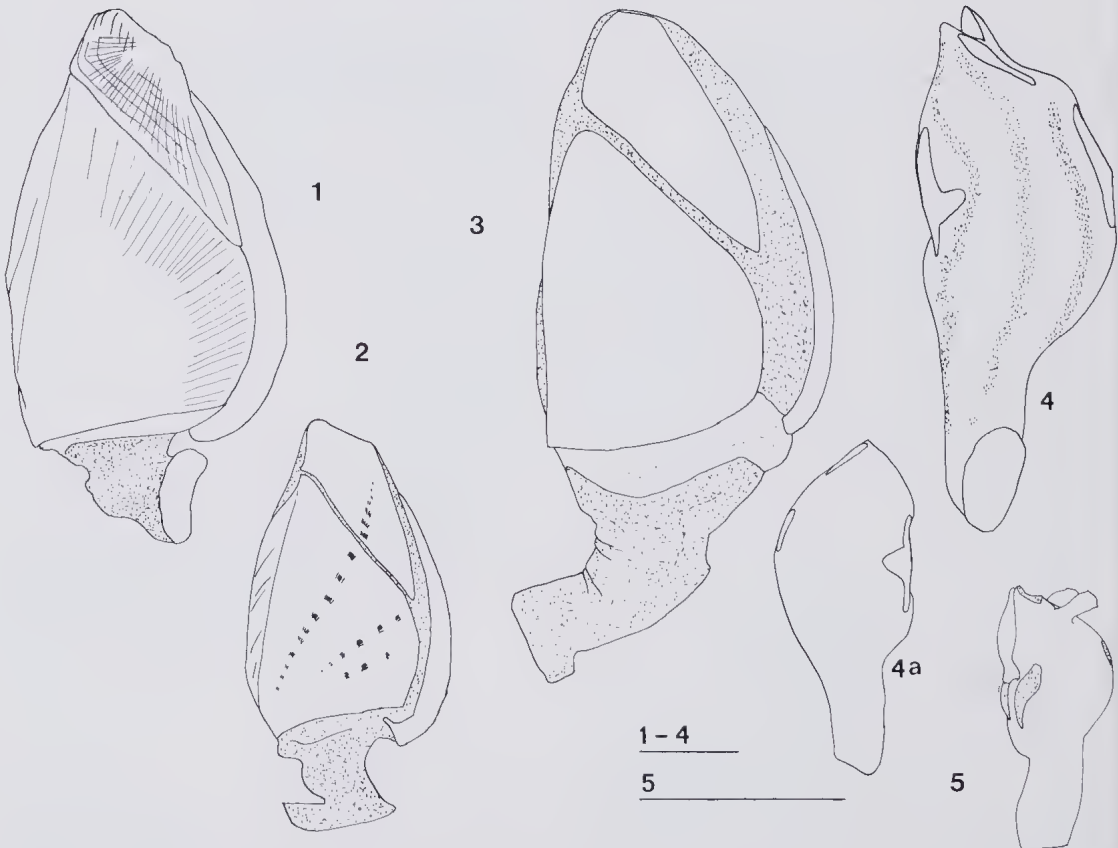
***Lepas hillii* (Leach 1818)**
(Fig. 3)

MATERIAL EXAMINED

W6452, 1 specimen, Mon Repos, SE.Q., ex *Caretta caretta*.

Valves smooth, white; no umbonal teeth on scuta; carina well spaced from scuta and terga; peduncle dark purple brown with a broad pale band at the junction with the capitulum; cosmopolitan, possibly fewer specimens occur inshore (Stubbings 1967).

***Conchoderma virgatum* (Spengler 1790)**
(Fig. 4)



FIGS. 1-5: 1. *Lepas anserifera*, W6456; 2. *L. anatifera*, W6455; 3. *L. hillii*, W6452; 4. *Conchoderma virgatum*, W6496; 4a. *C. v. chelonophilum*, W7368; 5. *C. auritum*, W4637. Scales = 5 mm.

MATERIAL EXAMINED

W4636, W7369, 5 specimens, Heron I., SE.Q.; W6496, 2 specimens, Mon Repos, SE.Q.; all ex *Caretta caretta*.

Scutum small, three lobed, carina opposite scuta and as long; terga small, curved, apically divergent; peduncle merges into capitulum, both with three longitudinal purple stripes; cosmopolitan tropical — warm temperate waters (Stubbings 1967).

***Conchoderma virgatum chelonophilum* (Leach 1818)**
(Fig. 4a)

MATERIAL EXAMINED

W7368, 3 specimens, Heron I., SE.Q., ex mouth of *Caretta caretta*.

The largest specimen is 12 mm long, white, capitulum rounded, peduncle distinct; scuta trilobed, carina narrow, opposite scuta, terga very small.

Conchoderma auritum (Linnaeus 1767)

MATERIAL EXAMINED

W4637, Heron I., SE.Q., ex *Platylepas hexastylus* on *Caretta caretta*.

The single specimen recorded here is very small (7 mm) but has the characteristic ear like appendages on the posterodorsal aspect of the capitulum. 'Extremely common from all parts of the world' (Darwin 1851).

Family BALANIDAE

Balanus trigonus Darwin 1854

(Plate 1, fig. 1)

MATERIAL EXAMINED

W6497, W7376, 55 specimens, Mon Repos, SE.Q., ex *Caretta caretta*.

Specimens are up to 11.5 mm basal diameter; steeply conical, deep pink with raised white ribs. The orifice is triangular and the scuta have a characteristic row of pits.

Cosmopolitan in tropical and sub-tropical coastal waters (Stubbings 1967) and recorded from hard substrates to 120 m by Pope (1945).

Balanus variegatus (Darwin 1854)

(Plate 1, fig. 2)

MATERIAL EXAMINED

W7377, W7380, 6 specimens, Mon Repos, SE.Q., ex *Caretta caretta*.

Specimens are up to 9 mm basal diameter, steeply conical, the summits of the radii oblique; colour deep mauve-pink. The spur on the tergum is short and well removed from the basiscutal angle. Harding (1962) includes material from New Zealand and the East coast of Australia in this species.

Family CORONULIDAE

Sub Family CHELONIBIINAE

Chelonibia testudinaria (Linnaeus 1758)

(Plate 1, fig. 3)

MATERIAL EXAMINED

W4902, W4904, 10 specimens, Heron I., SE.Q., all ex *Chelonia mydas*; W3067, W6500, W7370-1, 7 specimens, Mon Repos, SE.Q., W4840, W4846, 5 specimens, Heron I., SE.Q., all ex *Caretta caretta*; W6499, 1 specimen, Mon Repos, SE.Q., ex *Chelonia depressa*; W7373, 1 specimen, Boydong I., N.Q., ex *Eretmochelys imbricata*.

Shell shallow domed cone shape, up to 60 mm basal diameter, massive, smooth; base oval to round; radii with characteristic toothed pattern; adherent to surface of scutes of host, and in no specimen of this collection is there any sign of embedding; cosmopolitan in tropical and warm temperate seas (Pilsbry 1916).

Chelonibia caretta (Spengler 1790)

(Plate 1, fig. 4)

MATERIAL EXAMINED

W3654, 15 specimens, North Reef, N.Q., W4903, 5 specimens, Heron I., SE.Q., W6498, 2 specimens, Wistari Reef, SE.Q., all ex *Caretta caretta*; W7372, 1 specimen, Boydong I., N.Q., W7374, 3 specimens, Wistari Reef, SE.Q., all ex *Eretmochelys imbricata*.

Shell rounded, conical, up to 35 mm basal diameter, rough; radii narrow; orifice eroded; all specimens show evidence of embedding in host tissue (see Pilsbry 1916); an apparently tropical species (Pilsbry 1916; Stubbings 1967).

Sub Family CORONULINAE

Tubicinella cheloniae sp. nov.

(Fig. 6; Plate 1, figs. 5, 6)

Stephanolepas muricata: Nilsson-Cantell, 1932, p. 258, pls. 1-3; Hendrickson, 1958, p. 524, pl. 10; Zullo, 1963 (in part), p. 308; Newman, Zullo, and Withers, 1969 (in part), p. R289.

[non] *Stephanolepas muricata* Fischer, 1886, p. 193, pl. 4, figs. 9-11; Gruvel, 1903, p. 149, pl. 2, figs. 1-3; 1905, p. 279; Pilsbry, 1916, p. 271, 289; Zullo, 1963 (in part), p. 308; Newman, Zullo, and Withers, 1969 (in part), p. R289.

MATERIAL EXAMINED

HOLOTYPE: W7248, Mon Repos, via Bundaberg, SE.Q., ex *Caretta caretta* (recently drowned and washed ashore), - .xii.1968, C. Limpus.

PARATYPES: W6501, 2 specimens, same data as Holotype, W6502, 1 specimen, Mon Repos, via Bundaberg, SE.Q., ex *Caretta caretta*.

OTHER MATERIAL: W7356, 7 specimens, Mon Repos, SE.Q., ex *Caretta caretta*.

DIAGNOSIS

Tubicinella with areas of horizontally flattened upward curving spines projecting from the lateral edges of the compartments; burrowing in chelonians, the orifice below the level of host scutes.

DESCRIPTION OF HOLOTYPE

Shell cylindrical, porose, slightly curved laterally, completely embedded and solidly formed. Orifice slightly larger than basis. Length 19.8 mm, basal diameters 6.6 mm \times 8.75 mm, opercular diameters 9.6 mm \times 11.7 mm.

Externally each compartment has a median longitudinally ridged area. The ridges correspond to septae between the inner and outer laminae and end in a series of fine teeth that protrude from the convex basal margin of the compartment.

The lateral edges of each compartment are smooth on the outer surface. From adjacent edges of contiguous compartments arise a series of large and small, out and upcurving flattened projections, each projection being formed by a contribution from each of the adjacent compartments. These projections at each of the six sutural junctions are arranged approximately in rings up the column of the shell, projections of each ring being united by a fine ridge across the face of the compartments.

The sheath extends approximately 70% the depth of the shell where it ends in a slight ridge. At the orifice the sheath and external wall end in a rough broken edge.

The radii are narrow, smooth at their junction with the compartment whence the projections

arise, and transversely ridged laterally. The ridged portion is overlain by a smooth 'secondary covering' (Nilsson-Cantell 1932) arising from the adjacent compartment. This secondary covering contributes to the projections mentioned above.

The alae are thin, and beyond the limit of the sheath, taper into their own compartment.

The valves extend the full length of the opening and are loosely articulated in the heavy opercular membrane.

The labrum is notched, fringed with hairs, and has two teeth on one side of the notch, and none the other. The palp is club shaped, the mesial margin densely clothed in heavily setose spines, the apical and lateral margins more sparsely clothed in long finely setose spines.

The mandible has four teeth, the first and fourth single, the second and third double. There is an accessory tooth between the second and third, and the third and fourth main teeth.

Maxilla I has a straight edge, notched, with two stout spines above the notch, and eight lesser spines below.

Maxilla II has a medial lobe. The smaller of the two outer lobes has a field of long spines mesially on the anterior face. Proximolaterally there is an area of small round papillae (? sensillae) and disterolaterally there is an area of small spines. The larger lobe has a row of long spines along the mesial margin, a dense tuft of long spines apically, and an area of small spines distally on the lateral margin.

The penis is long and annulated with four longitudinal rows of hairs on the distal portion and a fringe of setae apically.

Cirrus I has the anterior ramus twice the length of the posterior (segment numbers 14 and 8). The pedicel is broad and has a fringe of hairs laterally. The segments are protuberant and have strong setal tufts.

VARIATION IN PARATYPES

There is no notable variation in the paratypes except in the irregularity of the development of the projections on the shell.

HOSTS AND DISTRIBUTION

Tubicinella cheloniae has been recorded from the carapace or plastron of *Chelonia mydas*, *Eretmochelys imbricata*, and *Caretta caretta* from Ceylon, Malaysia, and Australia. It is not possible to distinguish whether Newman, Zullo, and Whithers' (1969) record for *Stephanolepas muricata* is that species or *T. cheloniae*.

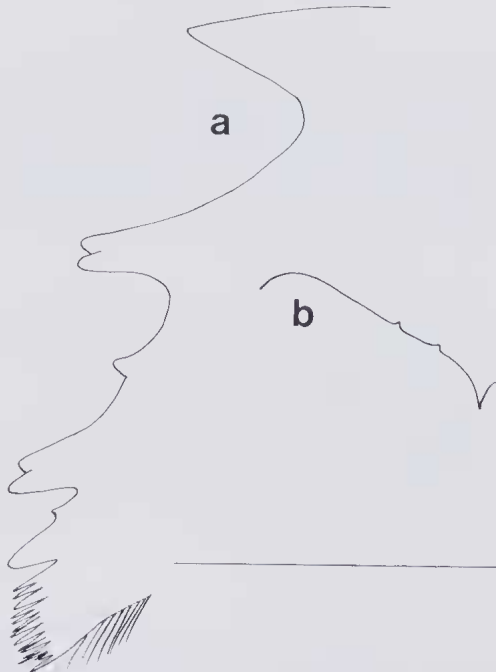


FIG. 6: *Tubicinella cheloniae*, Holotype W7248. a, mandible; b, labrum (half only, fringing hairs omitted). Scale = 0.5 mm.

DISCUSSION

In the collection on which this study is based there are some specimens referable to *Stephanolepas muricata* Fischer (1886), and others referable to *Stephanolepas muricata*: Nilsson-Cantell (1932). In our opinion they belong to two distinct species, and Nilsson-Cantell failed to recognise his material as a new species of *Tubicinella*, here described as *Tubicinella cheloniae* sp. nov.

Nilsson-Cantell believed his own material to be the adult, and Fischer's the juvenile, form of *S. muricata* Fischer, and on the basis of his own material Nilsson-Cantell questions several of Fischer's observations. Comparison of Fischer's type description and figures with material available to us, leaves us in no doubt of the accuracy of Fischer's observations (see following species description).

Nilsson-Cantell gives no grounds for his belief that his material is conspecific with *S. muricata*: his description shows pronounced affinities with *Tubicinella*. While it shows some differences from *T. major* Lamarck we have included this species in *Tubicinella* because of the strong affinity shown by the general facies of the shell and the mode of invasion of the host. It is certainly not congeneric with any other coronulid, and to create a new genus would not, we feel, adequately reflect the relationship of this species to other members of the family.

Sub Family PLATYLEPADINAE

***Stephanolepas muricata* Fischer 1886**

(Fig. 7; Plate 2, figs. 1-3)

Stephanolepas muricata Fischer, 1886, p. 193, pl. 4, figs. 9-11; Gruvel, 1903, p. 149, pl. 2, figs. 1-3; 1905, p. 279; Pilsbry, 1916, pp. 271, 289; Zullo, 1963 (in part), p. 308; Newman, Zullo, and Withers, 1969 (in part) p. R289.

[non] *Stephanolepas muricata*: Nilsson-Cantell, 1932, p. 258, figs. 1-2, pls. 1-3; Hendrickson, 1958, p. 524, pl. 10, figs. a-c; Zullo, 1963 (in part), p. 308; Newman, Zullo, and Withers, 1969 (in part) p. R289.

MATERIAL EXAMINED

W4845, W4908-10, 8 specimens, Heron I., SE.Q., W7360, 1 specimen, Mon Repos, SE.Q., all ex *Caretta caretta*; W4906-7, W4911-12, 26 specimens, Heron I., SE.Q., W7303, 1 specimen, Moreton Bay, SE.Q., all ex *Chelonia mydas*; W7359, 2 specimens, Boydong I., N.Q., ex *Eretmochelys imbricata*.

DISCUSSION

Shell fragile, not porose, completely embedded in host, orifice approximately twice diameter of

basis, larger specimens 4-6 mm greatest diameter.

Externally each compartment with a medial smooth area, lower edge thin, concave, without fine teeth, upper edge broken away; 'spinous' areas laterally, 'spines' formed by convolutions in outer lamina, occurring at similar intervals on all compartments, producing rings of six 'spine' pairs at intervals up shell wall (see Fischer 1886, pl. 4, figs. 10-11).

Sheath projects above outer lamina and breaks off during growth; extends 75% of depth of shell, marked with white lines representing flaking off points as sheath is protruded during growth. Radii narrow and thin; alae thin and extend to lower limit of sheath where they terminate obliquely.

Scuta and terga extend full length of orifice; scutum equals tergum; scutum triangular, tergum rectangular.

Labrum notched; of three specimens dissected one had two teeth each side of the notch, the other two had none. In all cases the labrum was fringed with fine hairs.

Palp club shaped; mesial margin with a dense row of short strongly setose spines; apical and distrolateral margins with a few long sparsely setose spines; lateral margin with a row of short setae.



FIG. 7. *Stephanolepas muricata*, W4910, mandible. Scale = 0.5 mm.

Mandible with three major teeth, no interteeth; first tooth single, second double, third multiple, a crenulated lobe at the position of the fourth tooth; inferior angle pectinate in one specimen, composed of one or two broken spines in the other two.

Maxilla I notched, with two large spines above the notch and nine spines below in two specimens, eight in the third.

Maxilla II with a narrow medial lobe; smaller lateral lobe with a dense field of long spines disterolaterally, no small round papillae (? sensillae) proximolaterally; larger lobe with an apical tuft of long spines, a row of similar spines along mesial margin, an oblique field of long spines mesially on anterior surface, an area of small spines and small crescentic spine groups disterolaterally, no small round papillae (? sensillae) apparent.

Penis short and annulated, no rows of hairs, a few fine hairs distally, and a fringe of hairs around orifice.

HOSTS AND DISTRIBUTION

Fischer's (1886) material was from *Eretmochelys imbricata* from Indochina. It is not possible to determine whether Newman *et al.* (1969) recorded the present species or *Tubicinella cheloniae*. The material for this study is the first recorded from Australia, and possibly the first since Fischer. Hosts and localities are listed under 'Material Examined' above. All specimens were taken from the leading edge of the carpal area of the front flippers where they burrow through or between the epidermal scales.

DISCUSSION

Pilsbry (1916) placed *Stephanolepas* close to *Stomatolepas* in a platylepadine series within the Coronulinae. Nilsson-Cantell (1932) on the basis of his misidentification considered *Stephanolepas* in the coronulid series. Hiro (1936) adopted Nilsson-Cantell's opinion and incorporated *Stephanolepas* into the coronulid series along with *Coronula*, *Cryptolepas*, *Xenobalanus*, and *Tubicinella*, leaving *Platylepas*, *Cylindrolepas* and *Stomatolepas* in the platylepadine series. Zullo (1963, 1967) echoed this in his formal elevation of these series to subfamily rank. Newman and Ross (1976) have returned *Stephanolepas* to the subfamily Platylepadinae.

Stomatolepas Pilsbry 1910

It has been almost universally regarded that the only valid name in this genus is *Stomatolepas*

elegans Costa 1838, and most records heretofore have been included in this species. The only exceptions have been *Stomatolepas praegustator* Pilsbry (1910, 1916) and Wells (1966), and *Stomatolepas transversa* Nilsson-Cantell (1930 a and b).

We have been unable to ascertain whether the types of *S. elegans* are extant or not, but we have seen the types of *S. praegustator* and *S. transversa*. These latter two species appear to be quite distinct (see following descriptions).

In our collections we have three species of *Stomatolepas*; *S. praegustator*, *S. transversa* and a third species which we describe as new under the name *S. dermochelys* while regarding *S. elegans* as a nomen dubium. In support of this we cite the following:

(a) The existence of the types of *S. elegans* is uncertain.

(b) Costa's descriptions of *S. elegans* are inadequate for the identification of his species. His diagnosis includes all 3 species of *Stomatolepas* in our collections.

(c) No host data is given for Costa's material. There is no ground for Pilsbry's (1916) hope that 'this lost species will probably be found again in the throat of sea turtles' since Costa himself did not know the host — or from what part of the host his material came.

'Trovato l'ò in Taranto; ma ignoro il corpo sul quale esso viveva: imperciocche io lo debbo alla compiacenza del signor D. Giovanni Membola, giudice de quel circondario, nella cui collezione giaceva indistinto.' I found it in Taranto, but I don't know the body on which it was living; but I am indebted to the kindness of Mr D. G. Membola, guide to the area, in whose collection it lay unrecognised.

'Le prominente unguiformi della base di ciascuna valvola componente il tubo mi fanno giudicare che impiantate esse fossero ad un corpo molle ed organico, siccome a testugine, a grosso granchio, od a qualche squalo.' The (finger) nail-like prominences* of the base of each valve making up the tube allow me to judge that perhaps it is implanted in a soft organic body, for example a turtle, a large crab, or some shark.

We do not think it adequate or desirable to select a neotype for *S. elegans* in this case until the existence or not of Costa's types is known with certainty. None the less we wish to draw attention to the fact that *Stomatolepas* contains more than

* Costa has described and figured the shell upside down. The finger nail like prominences in fact surround the orifice.

one species and that the name currently most commonly recorded (*S. elegans*) is of uncertain identity.

***Stomatolepas praegustator* Pilsbry 1910**
(Fig. 8, Plate 2, figs. 4–8)

Stomatolepas praegustator Pilsbry, 1910, p. 304, fig. 1; 1916, p. 209, pl. 68, figs. 1–1b.

Stomatolepas elegans: Hiro, 1936, p. 314, figs. 1–15; Relini, 1968, p. 225, figs. 7–10; Zullo, 1963, p. 313; Holthuis, 1969, fig. 2.

[non] *Stomatolepas elegans*: Zullo and Bleakney, 1966, p. 162, fig. 2; McCann, 1969, p. 152, figs. 1–5; Holthuis, 1969, p. 44; Brongersma, 1972, p. 53, p. 60; Smaldon and Lyster, 1976, p. 317.

MATERIAL EXAMINED

W4848, W7357, 19 specimens, Heron Is, SE.Q., W7358, 75 specimens, Mon Repos, SE.Q., U.S.N.M. 48094, 3 specimens, Tortugas, Florida (Pilsbry's (1910) paratypes of *S. praegustator*), all from gullet of *Caretta caretta*; W7481–6, 51 specimens, Mon Repos, SE.Q., ex *Caretta caretta* from soft skin of neck and base of front flipper.

HOSTS AND DISTRIBUTION

Hosts and localities recorded are: *Caretta caretta* from Gulf of Triest, Italy; Tortugas, Florida; and Heron I. and Mon Repos, Australia; and *Lepidochelys olivacea* from Seto, Japan.

DISCUSSION

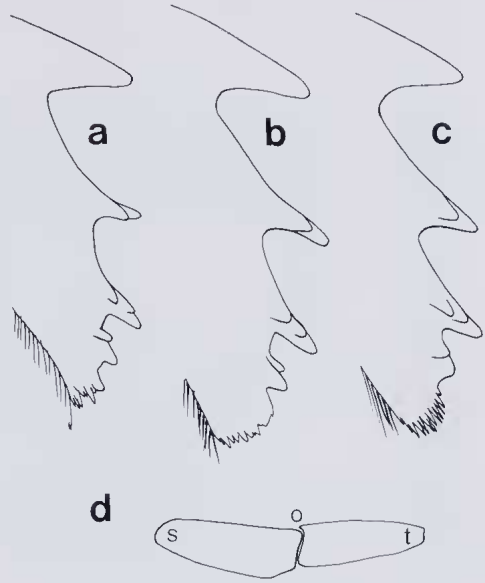
Hiro (1936) and Relini (1968) suspected there was only one species of *Stomatolepas* — *S. elegans* — and that *S. praegustator* Pilsbry (1910) and *S. transversa* Nilsson-Cantell (1930a, b) were probable synonyms of that species. Stubbings (1965, 1967) refers his material to *S. elegans* without description.

The external morphology of W4848 has been compared with that of U.S.N.M. 48094, Pilsbry's (1910) three paratypes of *S. praegustator*, and we consider them to be conspecific.

The description and figures of Hiro (1936) and Relini (1968) are adequate to allow the inclusion of their material under *S. praegustator*. Examination of Stubbings (1965) material is required to determine its identity. Holthuis' (1969) fig. 2 is after fig. 1 of Hiro (1936) and is therefore included under *S. praegustator*.

The shell is approximately circular in 'dorsal' aspect. Measurements from the 16 specimens in W4848 and the three in U.S.N.M. 48094 combined with data from Hiro (1936) and Relini (1968) give a mean length/breadth ratio of 1.16 (range 1.02–1.38) for a total of 26 specimens.

Some variation in labral tooth number is apparent (0–3 teeth) both between sides and between individuals. The mandible shows some variation around the basic pattern illustrated by Hiro (1936); three examples are shown in Fig. 8. The first tooth is single, the second double, the third treble, and the fourth distinct and double. The inferomedial angle is moderately pectinate. The cirri are all clothed with a dense covering of long fine hairs. The penis is as long as the sixth cirrus, annulated, and with an apical setal fringe.



a–c

d

FIG. 8: *Stomatolepas praegustator*, W4848. a–c, mandibular teeth; d, valves (s = scutum, t = tergum, o = orifice); Scales = 0.5 mm, a–c; 5 mm, d.

***Stomatolepas dermochelys* sp. nov.**

(Fig. 9; Plate 3, figs. 1–5)

Stomatolepas elegans: Zullo and Bleakney, 1966, p. 162, fig. 2; McCann, 1969, p. 152, figs. 1–5; Holthuis, 1969, p. 44; Brongersma, 1972, p. 53, p. 60; Smaldon and Lyster, 1976, p. 317.

MATERIAL EXAMINED

HOLOTYPE: W6505, Wreck Rock, near Bundaberg, SE.Q., ex *Dermochelys coriacea*, 17.1.1975, C. Limpus.

PARATYPES: W4639, 8 specimens, same data as holotype; N.Z.O.I. Z2278, 14 specimens, Wharama R., North Island, New Zealand; R.M.N.H. 1316, 6 specimens, Ameland, Friesland, Netherlands; R.M.N.H. 1314, 177 specimens, near The Lizard, Cornwall, United Kingdom; all ex *Dermochelys coriacea*.

OTHER MATERIAL. R.M.N.H. 1317, 3 specimens, Hondsbosche, seewering, Zijpe, Netherlands; R.M.N.H. 1318, 30 specimens, High Island, Co. Cork, Ireland.

DIAGNOSIS

Stomatolepas with a length breadth ratio of 1.31 (range 1.10–1.63), penis 2.5 times as long as cirrus VI, cirri IV–VI sparsely setose, and the fourth mandibular tooth a crenulated prominence fused to the shortly pectinate inferomedial angle of the mandible.

DESCRIPTION OF HOLOTYPE

Length 9.1 mm, width 6.9 mm, depth 3.6 mm, orifice larger than basis, shell oval bowl shape. Parities thin and formed as in *S. praegustator*; scales of the outer lamina composed of small oval convolutions; in more superior rows these convolutions distinct and separate, in inferior rows coalesced to form one laterally elongate scale with a crenulated upper margin, upper margin smooth on lowest row; scale rows narrow (5 rows in 250 μ at mid-depth): a triangular area bare of scales at middle of bottom edge of each compartment; radial grooves are wide at mid length.

Sheath projects above scaly outer layer in 'finger nail' like projections, extends to 75% of depth of outer layer, and is marked with white curved lines which represent 'flaking off' lines of projecting edge.

Scuta and terga not similar; terga subrectangular, scuta sinusoidal and forming a loose articulation with each other at anterior curve.

Labrum with a wide central notch, two teeth each side, and a fringe of fine hairs.

Palp rounded club shaped, fringed mesially, apically, and disterolaterally with long setose setae.

Mandible with four main teeth and no interteeth: first single, second double, third double, and fourth a crenulated prominence; inferior angle shortly pectinate.

Maxilla I notched with two strong spines above notch and 11 spines below.

Maxilla II with a rounded outer lobe, apically and mesially fringed with setae; inner lobe small rounded and with a row of setae mesially.

Anterior lobe of cirrus I twice length of posterior; rami of other cirri subequal; segments of cirri I–III protuberant and with strong setal brushes; segment numbers in Table 1.

Penis 2.5 times length of cirrus VI, annulated, with a few sparse hairs distally and a fringe of hairs around orifice.

VARIATION IN PARATYPES

The holotype and 42 of the paratypes have an average length/breadth ratio of 1.31 (range 1.10–1.63). There is no notable variation in the morphology of the shell structure.

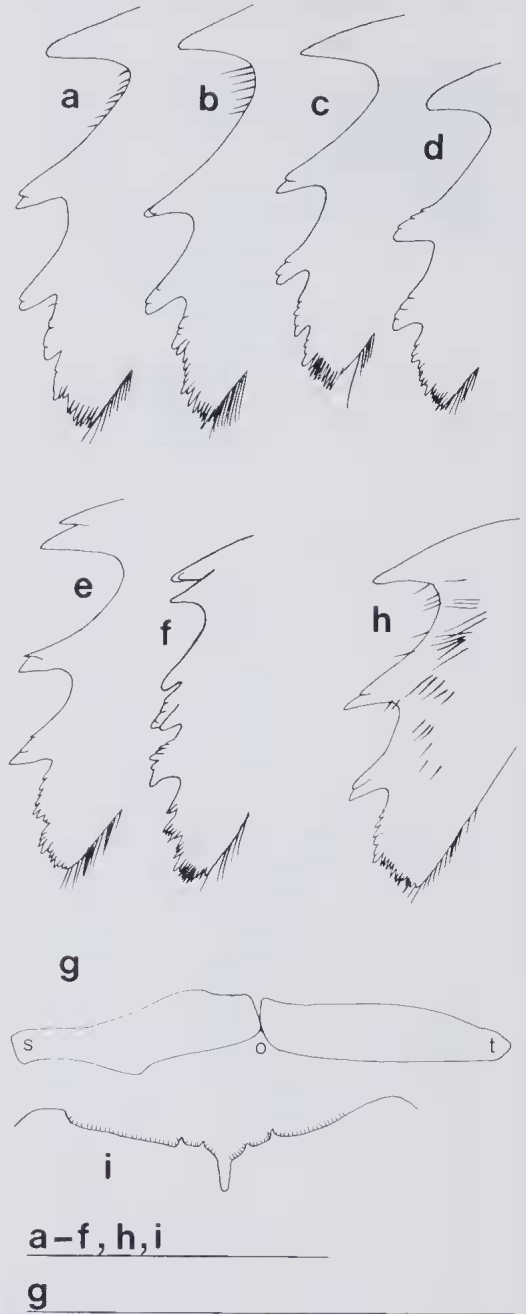


FIG 9: *Stomatolepas dermochelys*, Paratypes, W4639, a-f, mandibular teeth, g, valves (s = scutum, t = tergum, o = orifice); Holotype W6505, h, mandible, i, labrum. Scale = 0.5 mm, a-f, h, i; 5 mm, g.

TABLE 1: SEGMENT NUMBERS OF CIRRI IN ONE SPECIES OF *STOMATOLEPAS* AND THREE OF *PLATYLEPAS*

Species	Cirrus*					
	I	II	III	IV	V	VI
<i>S. dermochelys</i>	13:7	8:7	9: 8	15:16	16:17	17:13
<i>P. hexastylus</i>	13:7	10:9	12:11	19:17	22:20	21:19
<i>P. decorata</i>	11:7	9:8	10: 9	14:16	20:22	20:19
<i>P. coriacea</i>	13:7	8:8	10: 7	14:**	16:**	18:17

* (anterior : posterior rami)

** ramus broken

The labrum may bear up to three teeth each side of the notch, and there may be different numbers on each side in the same specimen. The mandibles of the 10 specimens dissected conform to a similar plan. There are three distinct main teeth and no accessory teeth. The first is single (occasionally double) the second double (occasionally multiple), the third treble (occasionally double or multiple). The position of the fourth tooth is always marked by a crenulated lobe closely adjacent to the shortly pectinate inferomedial angle.

All specimens were deeply embedded, there being little free scaly outer wall showing above the ridge marking the host tissue level.

HOSTS AND DISTRIBUTION

S. dermochelys has been recorded only from the Leatherback turtle, *Dermochelys coriacea*, from the soft skin at the base of the flippers and tail, and once from the palate (Brongersma 1972, p. 60). Locality records are Norway, Scotland, Ireland, Cornwall, Netherlands, Malaya, Queensland, New Zealand, and Nova Scotia.

DISCUSSION

Material from Queensland, New Zealand, Netherlands, Ireland and Cornwall has been examined in this study. Smaldon and Lyster (1976) considered the Norwegian, Scottish, Malayan, and Cornish specimens to be conspecific. On the basis of their identifications, consideration of the host, and the present examination of other specimens of the Cornish record, Smaldon and Lyster's material is included in this species. The Nova Scotian material is included on the basis of the host, and the shape of the lower scales (Zullo and Bleakney 1966, fig. 2).

S. dermochelys is readily distinguished from *S. praegustator* to which it is most similar by: the length/width ratio, 1.31 (range 1.10–1.63) in *S. dermochelys*, 1.16 (range 1.02–1.38) in *S. praegustator*; the longer penis in *S. dermochelys*,

2.5 times cirrus VI, 1 times cirrus VI in *S. praegustator*; the fourth mandibular tooth, a crenulated lobe in *S. dermochelys*, a distinct bifid tooth in *S. praegustator*; the shape and configuration of the external scales, *S. dermochelys* has 5 scale rows in 250 μ at mid depth, *S. praegustator* as 3 rows in 250 μ (see plates); and host.

Stomatolepas transversa Nilsson-Cantell, 1930a (Plate 6, figs. 1–6)

Stomatolepas transversa Nilsson-Cantell, 1930a, p. 2; 1930b, p. 20.

MATERIAL EXAMINED

W7468, W7471, 4 specimens, Wistari Reef, SE.Q., W7469–70, 16 specimens, Heron I., SE.Q., all ex *Chelonia mydas*, from midline groove of plastron; I.R.S.N.B., (no number), 5 specimens, Enoe I., Aroe Archipelago, (Nilsson-Cantell's types).

HOST AND DISTRIBUTION

S. transversa has been recorded from the median groove of the plastron of *Chelonia mydas* from Aroe Archipelago and Southeast Queensland.

DISCUSSION

The morphology of the external scales of the shell is quite distinct. The transverse scales which carry small upward projections along all of their upper edge in *S. praegustator* and *S. dermochelys* have 1–3 such projections only at their lateral ends on the lateral compartments in *S. transversa*. The rostrum and earina are both very narrow but still have a similar, though cramped, arrangement of the scales.

S. transversa in the most elongate of the three species of *Stomatolepas* and has a length-breadth ratio of 1.75 (range 1.53–2.29).

S. transversa is distinguished from the other species of *Stomatolepas* by its host and position, elongate proportions, and configuration of the external scales.

Platylepas hexastylus (Fabricius 1978) (Fig. 10; Plate 3, figs. 6–8; Plate 4, figs. 1–4)

MATERIAL EXAMINED

W4635, W4844, W4847, W4918, W6503, W7364, 13 specimens, Heron I., SE.Q., W6504, 1 specimen, The Oaks, via Bundaberg, SE.Q., all ex *Caretta caretta*; W7304, 1 specimen, Moreton Bay, SE.Q., ex *Chelonia mydas*; W7365, 4 specimens, Boydong I., N.Q., W7367, 12 specimens, Wistari Reef SE.Q., ex *Eretmochelys imbricata*; W7366, 8 specimens, Mon Repos, SE.Q., ex *Chelonia depressa*.

DESCRIPTION

The present material is in agreement with the descriptions of Darwin (1854), Pilsbry (1916), Kruger (1912), Hiro (1937), and Stubbings (1965). However a detailed description is included here for comparison with other species of the genus.

Shell low, conical, margin multilobed, and orifice small. Major diameter 10–14 mm.

Outer lamina with prominent wear areas around orifice; radii narrow, their free edges not hidden under secondary growth from adjacent compartment, simple septae at their edges; growth lines the predominant sculpturing, septae visible through the wall, becoming more numerous peripherally; line of 'midrib fold' obvious, dividing each compartment into two main lobes, accessory 'folds' also in peripheral margin, these, 'midrib folds', and intercompartmental sutures, appear to enclose host tissue, perhaps as an anchor mechanism.

Sheath massive, with slight depressions between it and outer wall of shell either side of 'midrib', extends halfway to periphery along outer wall, that is about 75% of vertical height of shell; midribs extend only slightly below level of periphery giving slightly convex base; septae visible on inner face of outer wall towards periphery.

Valves subequal, extend full length of orifice.

Labrum notched, a tooth at each lateral angle and two or three teeth either side of notch.

Palp shaped as in Stubbings (1965); setae of mesial margin heavily and coarsely setose for

whole length, those of apex and lateral margin longer than former and lightly setose over distal half to two thirds of length.

Mandible in general agreement with descriptions of Stubbings (1965) and Kruger (1912) though the fourth tooth not so well developed as in Stubbings' material.

Maxilla I with 2 strong spines above and 8 lesser spines below notch.

Maxilla II in general agreement with description of Stubbings (1965); the spines, except those of apical cluster, finely setose on distal portions; a small fringe of hairs at basal end of mesial margin of larger lobe; disterolaterally on larger lobe an area of small crescentic spine groups, laterally on smaller lobe an area of small round papillae (? sensillae); smaller lobe with grooved mesial margin to receive medial lobe.

Anterior ramus of cirrus I twice posterior, segments of cirri I – III moderately to strongly protuberant with strong setal brushes; cirri IV – VI subequal, with four spine pairs per segment at mid length reducing to two at apex and at three base; on each segment distal spine pair longest and strongest, proximal pair shortest and weakest; segment numbers in Table 1.

Penis long and annulated, distal half with four longitudinal rows of fine hairs and a terminal tuft of bristles.

HOSTS AND DISTRIBUTION

P. hexastylus is recorded from a variety of chelonian and sirenian hosts from tropical and subtropical waters (Darwin 1854, Pilsbry 1916, Zullo 1963).

***Platylepas decorata* Darwin 1854**

(Fig. 11; Plate 4, figs. 5–8; Plate 6, figs. 7–8)

Platylepas decorata Darwin, 1854, p. 429, pl. 17, fig. 2a,b.

non *Platylepas decorata*: Nilsson-Cantell, 1921, p. 376, fig. 89.

Platylepas multidecorata Daniel, 1962, p. 641, figs. 1–2.

MATERIAL EXAMINED

W4913–5, W4917, W4919–20, 35 specimens, Heron I. Lagoon, SE.Q., ex *Chelonia mydas*; W4916, W4921–2, W7184, W7343, 7 specimens, Heron I. Lagoon, SE.Q., W7142, 12 specimens, Mon Repos, via Bundaberg, SE.Q., all from *Caretta caretta*. W7361–3, 13 specimens, Wistari Reef, SE.Q., ex *Eretmochelys imbricata*; B.M.N.H., no number, 1 specimen, Galapagos Arch., (Darwin material), Z.S.I., 1317/1, 1 specimen, Little Andaman I., (Daniel's paratype of *Platylepas multidecorata*).

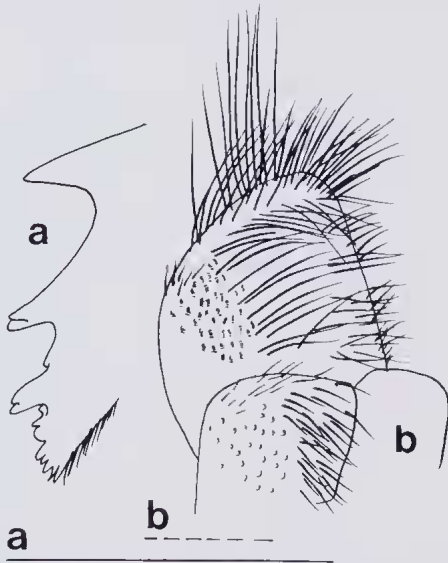


FIG. 10: *Platylepas hexastylus*, W4847, a, mandible; b, maxilla II. Scale a = 0.5 mm, b = 0.1 mm.

DESCRIPTION

Shell subcircular, ring-like, shallow, steep sided, and non-porose; orifice very nearly as large as basis; diameters of shell, 4 mm × 3 mm, height 2 mm.

Outer surface of each compartment sculptured with vertical ridges both double and simple (see Daniel 1962), lower edge dentate with projections of septae; summit of each compartment with prominent wear areas where layers of shell flake off; radii narrow with simple septate margins.

Sheath extends 85% of depth of outer wall; shallow pits between sheath and outer wall either side of 'midrib fold'; inner face of sheath marked with horizontal lines marking layers that flake off at summits; a vertical ridge in middle of sheath marks position of 'midrib fold'; midrib prop extends below sheath a distance equal to height of shell, deepest at inner edge, outer edge of process slopes obliquely up to periphery of shell.

Valves oblong and narrow, scuta longer than terga.

Labrum notched, 7–13 teeth on each side. The teeth extend from notch to lateral angle.

Palp club shaped, protuberant at proximal end of inner margin; rounded apex with a tuft of long spines, finely setose on distal portions; inner margin densely clothed in coarsely setose spines.

Mandible with four distinct main teeth, first and last single, second and third double; an intertooth between second and third, and third and fourth main teeth; also a reduced fifth tooth as a

crenulated lobe adjacent to pectinations of the inferior angle occasionally distinct; body of mandible clothed in rows of bristles.

Maxilla I with two large spines above notch and six below.

Maxilla II with a medial lobe; smaller lateral lobes grooved mesially to accept medial lobe, sparsely bristled mesially, an area of small round papillae (? sensillae) laterally; larger lobe with a row of strong spines on mesial edge, an apical tuft of long bristles, and a few bristles laterally; a small area of bristles on anterior face, a small area of small crescentic spine groups disterolaterally.

Anterior ramus of cirrus I twice posterior, segments of cirri I–III moderately protuberant, with strong setal brushes, cirri IV–VI subequal, with four spine pairs per segment, not equally strong, reducing to two or three pairs proximally and distally; segment numbers in Table 1.

Penis long, annulated, with four rows of fine hairs distally and a fringe of hairs at orifice.

HOSTS AND DISTRIBUTION

Hosts and localities are *Chelonia mydas* and *Caretta caretta* from Southeastern Queensland; *Eretmochelys imbricata* from Southeastern Queensland and Palau Is; and unknown hosts from Galapagos Archipelago, Low Archipelago, Little Andaman Island, and the Taumato Archipelago.

DISCUSSION

Darwin's (1854) description of *P. decorata* is incomplete in that no mention is made of mouthparts. He also says of the shell that 'the surface (and this is the chief external character) is marked by five longitudinal ridges, each of which . . . is found to be double . . . with minute beads on each side.' Plate 6, figs 7 and 8, shows a scanning electron micrograph of one of Darwin's specimens.

Daniel (1962) notes that *P. multidecorata* differs from *P. decorata* in (among other features) having 'simple ridges in addition to double ridges'. Plate 6, fig. 8 clearly shows that *P. decorata* has both simple and double ridges.

Daniel's diagnostic feature for *P. multidentata* is an elevated ridge on the external surface from mid height to the base of the shell. This feature can be seen in Plate 4, fig. 7. However, it can be seen in Plate 4, fig. 8 that this ridge is calcareous material that fills the sulcus of the infold of the compartment. This is easily eroded in upper parts of the compartment (Plate 4, fig. 8) or overgrown by the enlarging compartment (Plate 6, fig. 7). Daniel further notes that *P. multidecorata* has

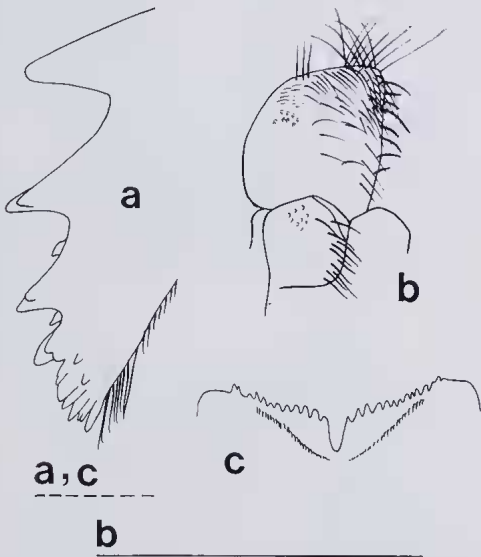


FIG. 11: *Platylepas decorata*, W7142, a, mandible; b, maxilla II, c, labrum (fringing hairs omitted). Scales a, c = 0.1 mm, b = 0.5 mm.

nine teeth on each side of the labrum where as *P. decorata* has only three. The only source for Daniel's information is Nilsson-Cantell (1921) who records '*P. decorata*' from a sea snake off the West Australian coast. Darwin's material (as seen by one of us, R.M.) is dry and no attempt has been made to rehydrate it. Consequently it is not possible to say how many labral teeth are present, but it is our opinion, based on other characters, that Darwin's material and ours are conspecific. Further comparison of our material with one of Daniel's paratypes leads us to the opinion that they are conspecific. We exclude Nilsson-Cantell's (1921) record from our synonymy, agreeing with Utinomi (1970) that this record is probably a misidentification.

***Platylepas coriacea* sp. nov.**
(Fig. 12; Plate 5, figs. 1-8)

MATERIAL EXAMINED

HOLOTYPE: W7247, Wreck Rock, near Bundaberg, SE.Q., ex *Dermochelys coriacea*, 17.i.1975, C. Limpus.

PARATYPES: W4638, 2 specimens, same data as Holotype. W4640, 7 specimens, Mon Repos, via Bundaberg, SE.Q., W4872, 2 specimens, Alexandra Headlands, SE.Q., all ex *Dermochelys coriacea*.

DIAGNOSIS

Large *Platylepas*, not embedded in host, midribs props, not, or only slightly, projecting below periphery of shell, basis flat, radii wide, found on *Dermochelys coriacea*.

DESCRIPTION OF HOLOTYPE

Shell subcircular, low and non-porose, 22.5 mm × 21.4 mm, 4.5 mm high; orifice subcircular 8.0 mm × 7.2 mm.

Outer surface sculptured with transverse lines of growth increments; midrib folds reach 75% to 90% up compartments towards summits and divide periphery into 12 subequal lobes; septae visible through outer lamina and protrude at periphery.

Radii wide, oblique at upper edge, free edges hidden beneath secondary covering from adjacent compartments.

Sheath shallow, extending only 15% along inner slope of shell, forming dense ring around orifice; deep pits either side of midrib between sheath and outerwall; midrib props extend as far as basis and curve centripetally; midrib fold extends only half depth of prop.

Septac visible on inner face of outer wall as far up as sheath.

Valves subequal extending full length of orifice; terga twisted through 90° along longitudinal axis.

Labrum with three teeth either side of notch and a fourth at each lateral angle; a marginal fringe of fine hairs from notch to beyond fourth tooth.

Palp club-shaped with protuberant inferomesial margin; mesial margin densely clothed in coarsely setose spines; apical and lateral margins more lightly clothed in longer spines plumose over distal portions.

Mandible with four teeth; second and third double, first and fourth single; an accessory tooth between second and third, and third and fourth teeth; inferomedial angle pectinate.

Maxilla I with two large spines above notch and eleven smaller spines below.

Maxilla II with a medial lobe; smaller of lateral lobes grooved mesially to receive medial lobe, densely bristled mesially, with a field of small crescentic spine groups disterolaterally, and a field of small round papillae (? sensillae) proximolaterally; larger lateral lobe moderately clothed along mesial margin with long spines, apex with a



FIG. 12: *Platylepas coriacea*, Holotype W7247, a, maxilla II; b, mandible; c, valves (s = scutum, t = tergum, o = orifice); Scale = 0.5 mm, a, b, 5 mm, c.

dense tuft of spinose spines, a longitudinal field of long spines in middle of anterior face, lateral to distal end of this field a group of small spines and small crescentic spine groups, an area of small spines on disterolateral margin.

Posterior ramus of cirrus I, 75% length of anterior; segments of cirri I-III protuberant with dense setal brushes; cirri IV-VI subequal and with 3 strong and 1 weak spine pair per segment, reducing to 2 strong and 1 weak proximally and distally; segment numbers in Table 1.

Penis long, annulated, with four longitudinal rows of hairs distally and a fringe of hairs around orifice.

VARIATION IN PARATYPES

In general morphology all the available material is very similar to the Holotype. Three paratypes were dissected. One had labial teeth similar to the holotype. The other two had 3/2 at the notch, and in one case no tooth at one lateral angle and two at the other. One specimen lacked the accessory tooth between the second and third main mandibular teeth, and spine numbers below the notch on Maxilla I were 8, 10 and 11.

HOST AND DISTRIBUTION

See Material Examined

DISCUSSION

P. coriacea is distinguished most readily from *P. hexastylus* and *P. decorata* by shell morphology. *P. coriacea* has wide radii, a twisted tergum, no secondary midribs and is not embedded. *P. hexastylus*, which is superficially similar to *P. coriacea*, has narrow radii, flat terga, secondary midribs and is partially embedded. The shell of *P. decorata* is small, ring like and completely embedded. *P. coriacea* appears to be confined to *Dermochelys coriacea*, while *P. hexastylus* and *P. decorata* from the collection available, seem to be excluded from this host.

KEY TO BARNACLES RECORDED ON TURTLES IN QUEENSLAND WATERS (Excluding *Balanus* species)

- 1. Barnacles stalked 2
- Barnacles sessile 6
- 2. Valves very reduced (*Conchoderma*) 3
- Valves well developed (*Lepas*) 4
- 3. Capitulum and pedicel with three longitudinal purple stripes; no external appendages (Fig. 4) *Conchoderma virgatum*

- Capitulum and pedicel concolourous; no appendages *C. v. chelonophilum*
- Capitulum and pedicel concolourous; two ear-like appendages posterodistally (Fig. 5) *C. auritum*
- 4. Pedicel with pale or brightly coloured band at junction with capitulum 5
- Pedicel without such a band, capitulum often with diagonal bands of dirty green squares (Fig. 2) *Lepas anatifera*
- 5. Valves smooth; carina well spaced from scuta; no umbonal teeth on scuta (Fig. 3) *L. hillii*
- Valves with radiating furrows; carina contiguous with scuta; a large umbonal tooth on the right (a small on the left) scutum (Fig. 1) *L. anserifera*
- 6. Shell massive; orifice small compared to base; not or only slightly embedded (*Chelonibiinae*) 7
- Shell moderately strong to fragile; orifice larger or smaller than base; partially to fully embedded, (except *Platylepas coriacea* on *Dermochelys coriacea*) 8
- 7. Shell smooth; radii with toothed pattern; not embedded (Plate 1, fig. 3) *Chelonibia testudinaria*
- Shell rough; radii narrow; partially embedded in scutes (Plate 1, fig. 4) *Chelonibia caretta*
- 8. Barnacle completely embedded in host, orifice below skin level 9
- Never as above 10
- 9. Large barnacles in groups of 2-4; embedded in carapace or plastron producing large ulcerous sores; shell tubular, (Fig. 6; Plate 1, figs. 5, 6) *Tubicinella cheloniae*
- Small barnacles; embedded in or between dermal plates of leading edge of front flipper; shell bowl-shaped (Fig. 7; Plate 2, figs. 1-3) *Stephanolepas muricata*
- 10. Shell bowl-shaped, orifice larger than basis; externally covered with small scales (*Stomatolepas*) 11
- Shell flat cone shape or ring like; deeply to not embedded; basis larger than orifice and showing six prominent bulges (*Platylepas*) 12
- 11. Embedded in gullet or soft shoulder skin of *Caretta caretta* and *Lepidochelys olivacea*, external scales as in Plate 2, figs. 4 and 8 *Stomatolepas praegustator*
- Embedded in soft skin (and gullet) of *Dermochelys coriacea*; external scales as in Plate 3, figs. 1 and 3 *S. dermochelys*

- Embedded in median groove of plastron of *Chelonia mydas*; external scales as in Plate 6, figs. 2 and 3 *S. transversa*
12. Shell ring-like; almost completely embedded, midrib props deeply penetrating; labrum with 7-13 teeth each side (Fig. 11) *Platylepas decorata*
- Shell flat cone shape; not or only partially embedded; labrum with 2-4 teeth each side 13
13. Shell partially embedded; on chelonians other than *Dermochelys coriacea*; mandible and maxilla II as in Fig. 10 *P. hexastylus*
- Shell not embedded; on *Dermochelys coriacea*; mandibles and maxilla II as in Fig. 12 *P. coriacea*
11. Embedded in gullet or soft shoulder skin of chelonians other than *Dermochelys coriacea*; mandibles and valves as in Fig. 8 *Stomatolepas praegustator*
- Embedded in soft shoulder skin of *Dermochelys coriacea*; mandibles and valves as in Fig. 9 *S. dermochelys*
- Embedded in median groove of plastron of *Chelonia mydas*; rostro-carinally elongate *S. transversa*
12. Shell ring-like; almost completely embedded, midrib props deeply penetrating; labrum with 7-13 teeth each side (Fig. 11) *Platylepas decorata*
- Shell flat cone shape; not or only partially embedded 13
13. Shell partially embedded; on chelonians other than *Dermochelys coriacea*; mandible and maxilla II as in Fig. 10 *P. hexastylus*
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ACKNOWLEDGMENTS

Thanks are due to Dr L. B. Holthuis, Leiden, Dr R. B. Manning, Washington, Dr D. E. Hurley, Wellington, Dr G. A. Boxshall, London, Dr K. A. Wouters, Brussels, and Dr G. Ramakrishna, Calcutta, who lent material in their care; Messrs A. J. Easton and R. Burgess who prepared the photographs; and Mr B. M. Campbell, Dr L. Cannon and Dr J. G. Greenwood for advice and discussions. Prof. V. A. Zullo, North Carolina, read the manuscript and offered useful criticisms.

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PLATE I

FIG. 1: *Balanus trigonus* Darwin, W6597

FIG. 2: *Balanus variegatus* (Darwin), W7380

FIG. 3: *Chelonibia testudinaria* (Linnaeus), W3067

FIG. 4: *Chelonibia caretta* (Spengler), W3654

FIGS. 5, 6: *Tubicinella cheloniae* sp. nov., Holotype, W7248.

Scale lines = 10 mm.

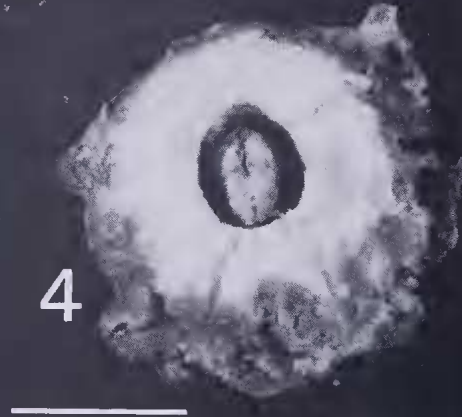
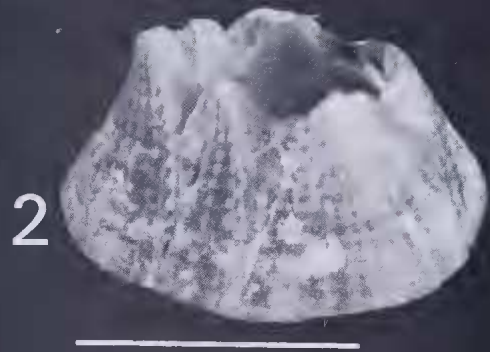
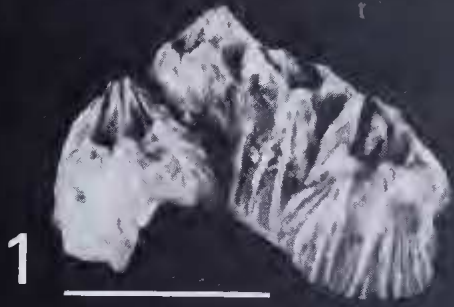


PLATE 2

FIGS. 1-3: *Stephanolepas muricata* Fischer, W7359; 1, whole animal with investing layers of host tissue, membranous basis to the left; 2, exterior of a lateral compartment; 3, sheath of a lateral compartment.

FIGS. 4-8: *Stomatolepas praegustator* Pilsbry, W7358, aspects of a lateral compartment; 4, exterior; 5, alar edge; 6, sheath; 7, radial edge; 8, detail of growth of exterior scales.

Scale lines: Fig. 1 = 1 mm; Figs. 2-8 = 0.05 mm.

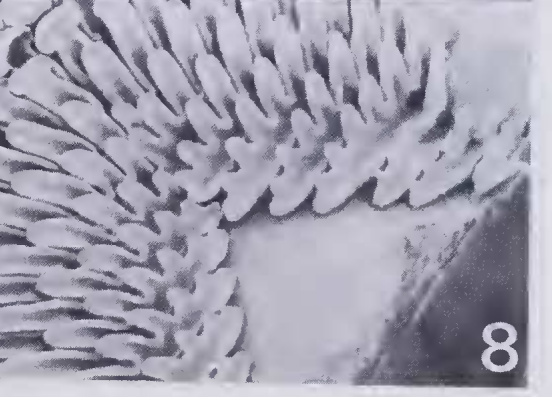
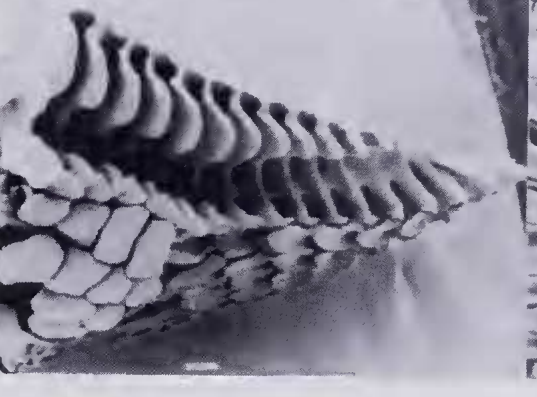
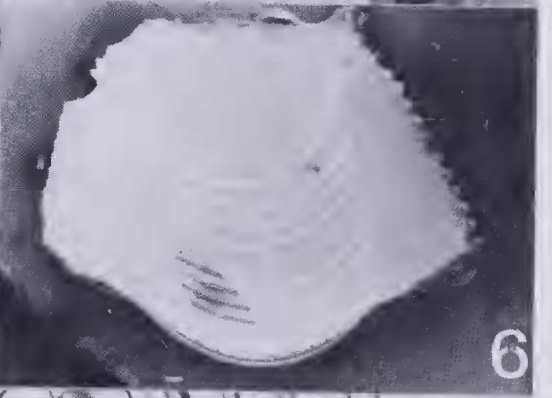
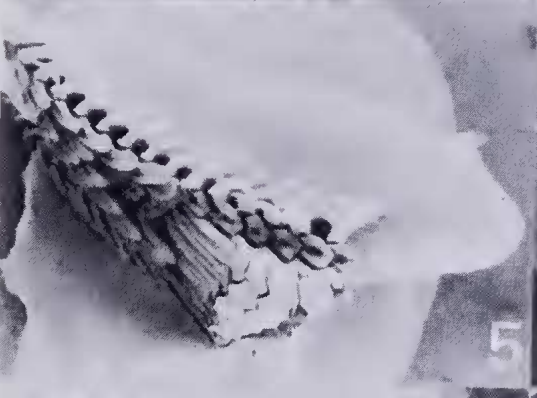
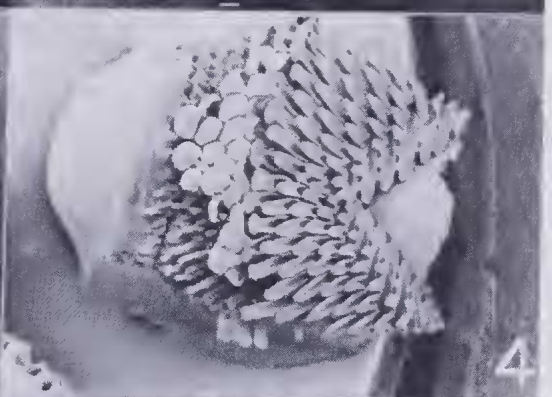
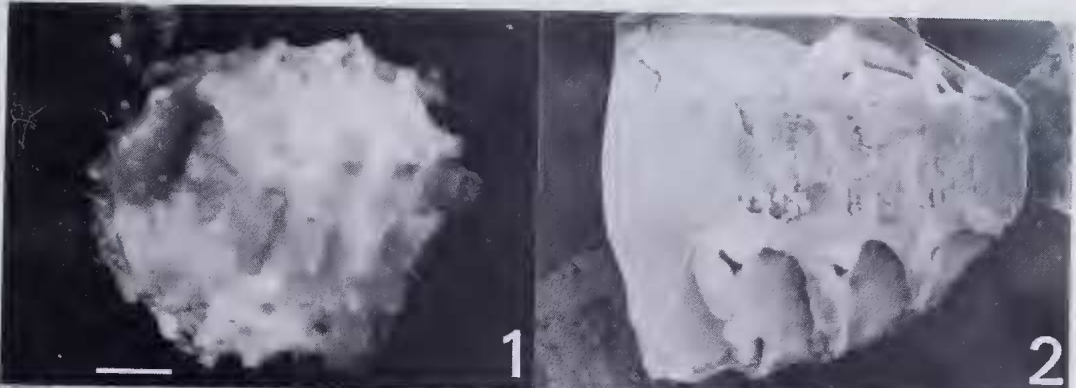


PLATE 3

FIGS. 1-5: *Stomatolepas dermochelys* sp. nov., Paratype, W4639; 1, exterior of carina; 2, sheath of a lateral compartment; 3, detail of growth of exterior scales; 4, radial edge; 5, alar edge.

FIGS. 6-7: *Platylepas hexastylos* (Fabricius), W7365; 6, basal aspect, and 7, opercular aspect of whole shell.

FIG. 8: *Platylepas hexastylos* (Fabricius), W4847, exterior aspect of rostrum.

Scale lines: Figs. 1-5, 8, = 0.05 mm; Figs. 6, 7 = 1 mm.

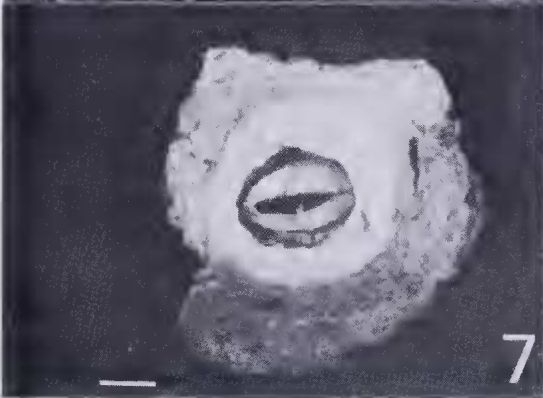
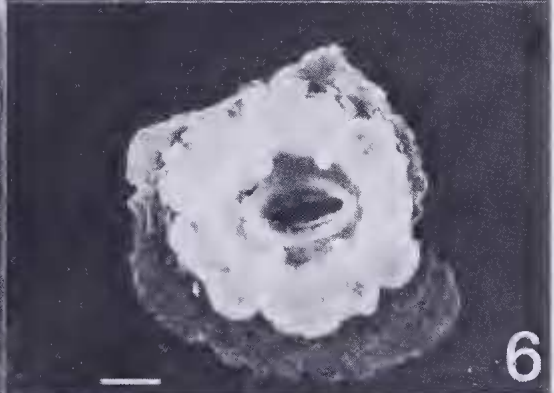
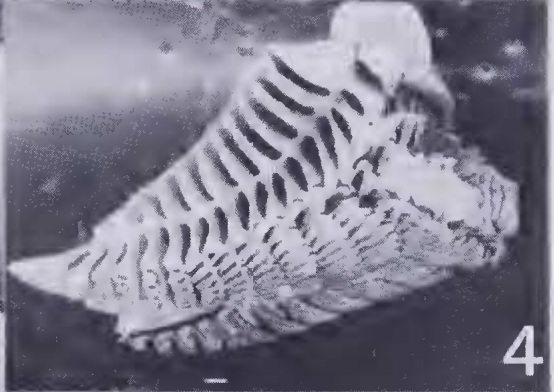
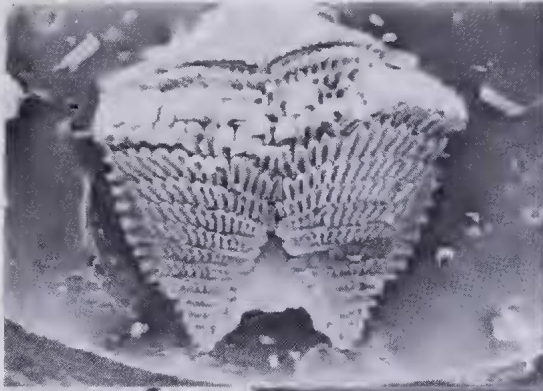


PLATE 4

FIGS. 1-4: *Platylepas hexastylus* (Fabricius), W4847; 1, basal aspect of carina; 2, oblique basal aspect a lateral compartment showing midrib; 3, opercular aspect of rostrum; 4, basal aspect of a lateral compartment showing an 'accessory' fold at the top right.

FIG. 5: *Platylepas decorata* Darwin, W7363.

FIGS. 6-8: *Platylepas decorata* Darwin, W7142; 6, alar aspect of a compartment showing triangular shape of midrib 'prop'; 7, exterior aspect of compartment; 8, opercular aspect of rostrum.

Scale lines: Figs. 1-4, 6-8, = 0.05 mm; Fig. 5 = 1 mm.

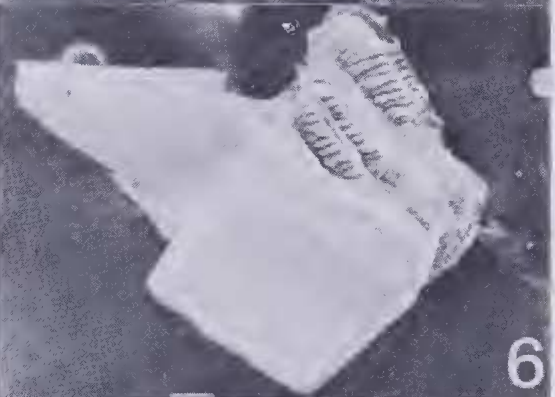
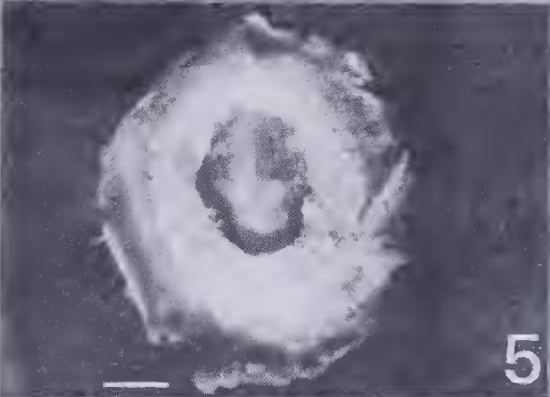


PLATE 5

FIGS. 1-2: *Platylepas coriacea*, sp. nov. holotype, W7247; 1, opercular aspect; 2, basal aspect.

FIGS. 3-8: *Platylepas coriacea*, sp. nov., paratype, W4640; 3, exterior aspect of rostrum; 4, interior aspect of a lateral compartment; 5, detail of peripheral edge and growth lines; 6, oblique basal aspect of a lateral compartment showing ala, and 'pits' behind sheath; 7, 8, exterior oblique views of alar.

Scale lines: Figs. 1-2, 1 div. = 1 mm; Figs. 3-8, = 0.05 mm.

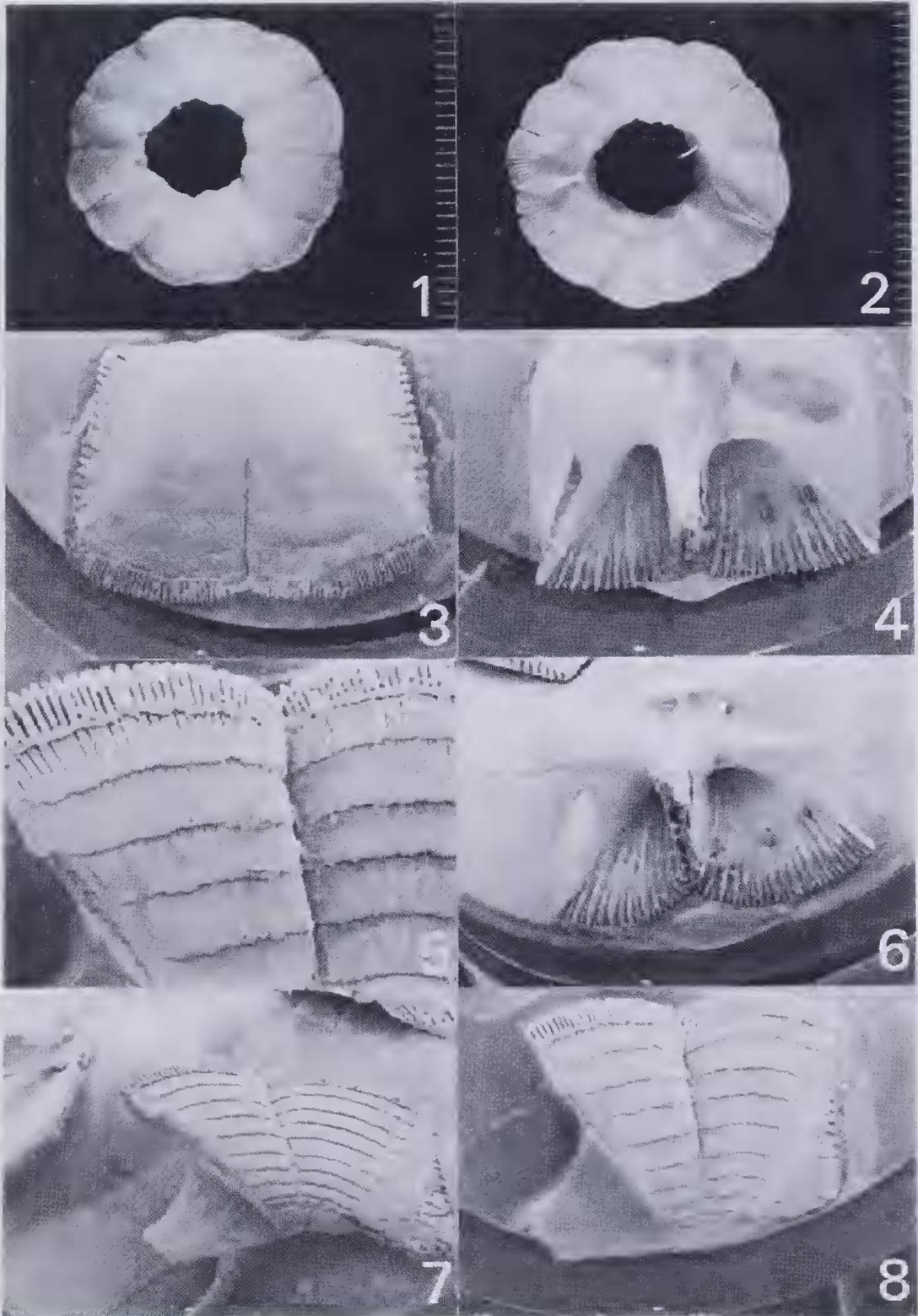


PLATE 6

FIGS. 1-2: *Stomatolepas transversa*, Nilsson-Cantell, Paratype, I.R.S.N.B. (no number); 1, carina; 2, fragment of a lateral compartment.

FIGS. 3-6: *Stomatolepas transversa*, Nilsson-Cantell, W7471; 3, carina; 4, carino-lateral; 5, view of ala; 6, view of radius.

FIGS. 7-8: *Platylepas decorata* Darwin, B.M.N.H. (no number); 7, a lateral compartment; 8, detail of 7 showing sculpturing.

Scale lines: Figs. 1-8, 1 div. = 0.05 mm.

